Force-Deformation Evaluation Unit FSA-Q series

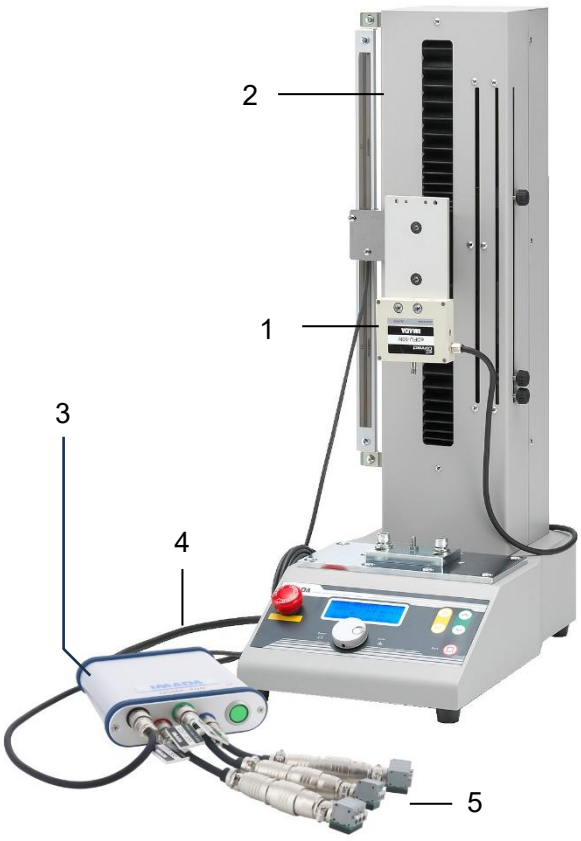
- Easy-to-use Evaluation Unit for sample deformation by force application
- The Software displays the Force Value, Displacement, and 3 Strain positions in real-time
- Graphs of each measured value plotted at the aligned time axis for analysis
- Exchangeable optional attachments enables measurement variations

*The Strain Gauges and Attachments sold separately.

Features	
Simultaneous Measurement and Display of Force / Displacement / Strain In addition to the force value and displacement (travel distance) of the load cell, strain at 3 different positions measured simultaneously. Each measured value displayed on the software in real-time. Other measurement combination such as Force and Strain at 2 positions are also possible with the use of additional load cells. (*1/*2)	**Simultaneous Graphing of Per Channel Measured Values** Graphing Software available for download from IMADA connected enables simultaneous graphing of force-time / displacement-time and 3 strain-time positions. Graphs with the measured values on a time axis enable correlation analysis of each measured value. (*2)
Highly Reproducible Measurements Force values and strain changes are acquired with high-speed sampling rate of 2000 times/second. Highly reproducible measurement data can be obtained by capturing rapid changes of force and strain.	**Output CSV Data** Output Data is imported to the graphing software as CSV data with the aligned time axis. The force-displacement and force-strain graphs (and others) are created from the CSV data with spreadsheet software. (*2)

*1 Strain gauge is not included in the Unit. An additional strain gauge (350Ω) is required for the Strain measurement.
*2 To use the FSA-Q Series, a PC connected to the dedicated graphing Software Quad Graph Drawer must be installed and made available. Quad Graph Drawer is downloaded from IMADA Connected with the prior User and QSMA-400 product registration on IMADA Connected, and a suitable internet environment must be available.

[Product configuration]



1. Load Cell eDPU Series

A sensor for measuring Force. It can be attached to the motorized test stand EMX-FA series. By attaching optional attachments, it can be used to measure a variety of samples. (*1)

2. Motorized test stand with a linear scale EMX-FA series

High-performance motorized test stand with high rigidity, enabling measurement precision. Achieved stable test speed and direction for measurement reproducibility. Equipped with a linear scale for the load cell's displacement (movement) measurement. Choices of EMX-500N-FA with maximum Force of 500N and EMX-1000N-FA with maximum Force of 1000N. (*2)

3. Quad Sensor Measuring Amplifier QSMA-400

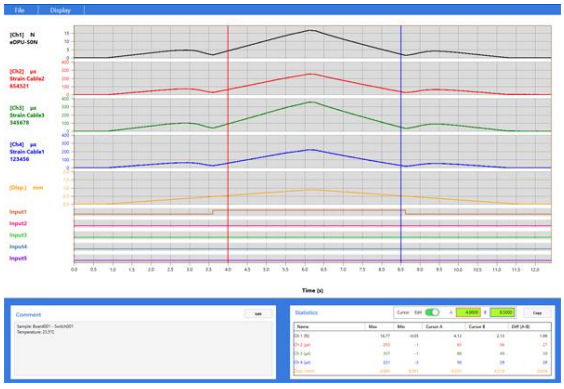
An amplifier for inputting force, displacement, and strain. The force values and strain can be input up to 4 channels in total. A PC with the graph drawing Software Quad Graph Drawer installed is required. (*3)

**[Dedicated Software:
Quad Graph Drawer (included) (*3)]**

Software for displaying the Force, Displacement, and Strain entered the QSMA-400. Records continuous data for each measurement and graph time.

*For details, please refer to [4-channel Graphing Software Quad Graph Drawer] on page 4.

Quad Graph Drawer



4. Force Control Cable QCB-ST01

A dedicated cable for connecting the QSMA-400 and EMX-FA series to enable the force control function and overload stop functions. (*4 / *5)

5. Strain Gauge Connection Cable QST-350 3 pcs

Cables to input strain to the QSMA-400 for connecting strain gauge with lead wires for 350Ω. (*6)

*1 Attachments are not included in this Unit. Attachments necessary for the measurement are separately sold.
*2 The maximum force capacity of the entire configuration is limited based on the applied load cell and the attachment capacity.
*3 Quad Graph Drawer is downloaded from IMADA Connected with the prior User and QSMA-400 registration on IMADA Connected, and a suitable internet environment must be available.
*4 The force control function and the overload stop functions only operate for load cell values connected to CH1 of the QSMA-400.
*5 The overload stop function does not guarantee complete prevention of measuring equipment failure due to overload.
*6 Strain gauges are not included in this Unit.
See "Strain gauges and dedicated cables" on page 5 for strain gauge recommendations.
* Please refer to the individual specifications for each component product details.

[FSA-Q Series Models]

Model (*1)	Including Load Cell Capacity	Test Stand Models (*2)
FSA-Q-0.5KE-□□N	2N/5N/10N/20N/50N/100N/200N/500N	EMX-500N-FA
FSA-Q-1KE-□□N	2N/5N/10N/20N/50N/100N/200N/500N	EMX-1000N-FA

*1 Select force capacity required from the chart and enter the maximum force □□(N).
*2 Long stroke option is also available. For details, please refer to the EMX series specifications.

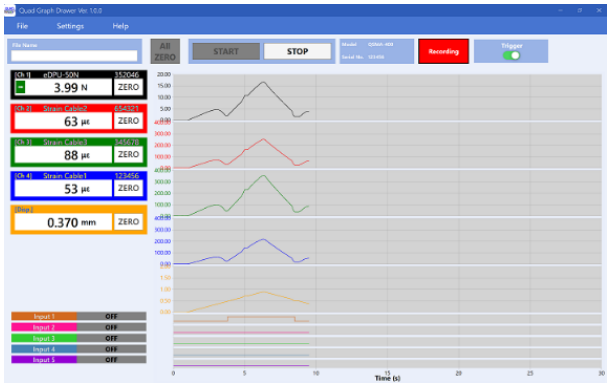
[Specification]

Model		FSA-Q-0.5KE-□□N	FSA-Q-1KE-□□N
Measurement Target		Force / Strain / Displacement (*1)	
Maximum Force Capacity		According to the Maximum Capacity of the Load Cell	
Accuracy	Force	±0.7%F.S.±1digit	
	Displacement	±0.1mm ±1 digit (at no Load) (*2)	
	Strain	Based on the Strain Gauge and Applied settings	
Display Resolution (*3)	Force	4 digits with signed decimal point (Eg: Display resolution of DPU- 5N is 0.001N)	
	Displacement	0.001mm (as shown in the Quad Graph Drawer)	
	Strain	Based on the Strain Gauge and Settings Used	
Measurement Unit	Force	N (ranges below 5N converted to mN)	
	Displacement	mm	
	Strain	Based on the Strain Gauge and Settings Used	
Sampling Rate		2000 times/sec (synchronous sampling / channel)	
Max. Sample Height (*4)		415mm: with eDPU-2N to 10N 410mm: with eDPU-20N to 500N	380mm: eDPU-2N to 10N 375mm: eDPU-20N to 500N
Amplifier Output Function		USB communication (2.0 or later) / 3-stage Comparator (-NG/OK/+NG) / Overload signal (*5)	
Link Function (*6 / *7)		Force Control Function, Overload Stop Function (*8)	
Power Supply	Amplifier	Powered by USB port / Dedicated AC adapter (AC100-240V Free Input)	
	Test Stand	Free AC100V to 240V input	
Operating Environment		Temperature: 0-40°C / Relative Humidity: 20-80%	
Available Options		-L: Motorized Test Stand Stroke Extension by 300 mm	
Accessories (*9)		Accessories for each Component	
Dedicated Software (included)		Downloadable Software: Quad Graph Drawer (Please refer to [4-channel Graphing Software Quad Graph Drawer] on page 4 for details.)	

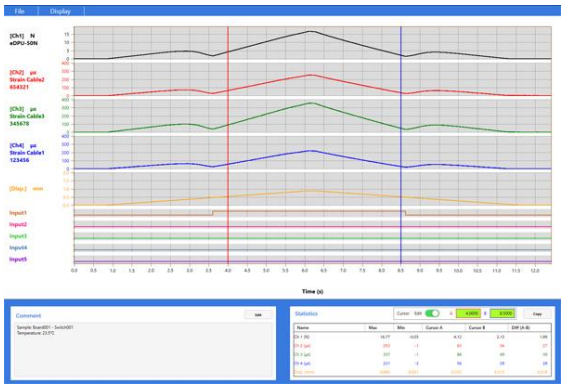
*1 The QSMA-400, the Quad Sensor Measuring Amplifier, also supports torque input, voltage, contact signal, and angle. A separate dedicated cable is required for voltage and contact signal input. Please refer to [Strain gauges and related cables] on page 5 for details. Please contact us for further information on Angle Input.
*2 When the maximum force of capacity is applied at the maximum stroke, the motorized test stand deflects 0.25 mm or less.
*3 Measurement values are not displayed on the QSMA-400 itself. A PC with a Quad Graph Drawer installed is required to display the measurement values. Please refer to [4-channel Graphing Software Quad Graph Drawer] for details about Quad Graph Drawer.
*4 The distance from the table to the Measurement Axis of the Load Cell at the head at maximum elevation.
*5 Settings are made from the Quad Graph Drawer. The load cell must be connected to CH1 for the Comparator value settings.
*6 The QSMA-400 and the EMX series motorized test stand connected with the included dedicated Cable QCB-ST01 to enable the alignment function. The alignment function is only available for the force value of the load cell connected to CH1 of the QSMA-400.
*7 High Low Output function unavailable for the QSMA-400. The contact and break detection functions of the EMX series are unapplicable.
*8 This function does not guarantee the complete prevention of failure of the measuring instrument due to overload.
*9 Optional attachments and PC are not included with this Unit.

[4-channel Graphing Software Quad Graph Drawer]

The PC software (available only in download version) for displaying, recording, and graphing measurement values entered the QSMA-400.



Displays measurement values for all channels in real-time. Continuous data recorded and graphed at 2000 data points per second.



Statistical values such as max. and min. values automatically displayed after recording. The measurement values checked for each graph at any stage.

[Other features]

- Supports manual recording and automatic recording by setting conditions (trigger function)
- Comment function allows you to record the environment during measurement
- Printing and CSV data output
- Comparator display (CH1 only when load cell is connected)
- Overload display (available with load cell in connection)
- Sensor settings (sign, unit, comparator value, etc.)

* Quad Graph Drawer is only offered in a download version. Download available from IMADA Connected by registering as a user on IMADA Connected and registering the QSMA-400 product. An internet connection is required to register on IMADA Connected, download, and install Quad Graph Drawer.

● Software Operating Environment

Operating Environment	Supported OS: Windows 10/11
Supported Hardware	CPU: Core i3 1GHz or higher recommended, Memory: 8GB or higher recommended, Hard disk: 10GB or more (data storage area)
Supported Platforms	.NET 8
Display	Resolution 1920 x 1080 pixels or higher
Cautionary Notes	- To download/ install/ use the software, Windows user account with the administrator rights is required. - An internet connection is necessary for downloading and installation.

[FSA-Q Series Use Cases]

Evaluating Board Deformation when a switch is pressed

A switch on the board is pressed at a constant force, and the deformation (deflection) of the entire board and localized strain (3 locations) are measured.

Identifying the position where deflection (strain) is likely to occur helps identify the component placement confirmation on the board.

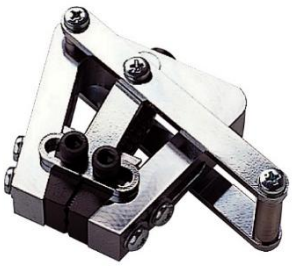
[Strain Gauge and Dedicated Cables]

Recommended strain gauge (*1) **FLAB-5-350-11-1LJC-F** **FLAB-5-350-23-1LJC-F**	Voltage Input Cable (Open End) **QVI-05**	Strain gauge connection cable (for 120 Ω) **Customized product**
		No image
Strain Gauge (350Ω) (20 bottles / box set) by Tokyo Measuring Instruments Laboratory Co., Ltd. For iron: FLAB-5-350-11-1LJC-F For aluminum: FLAB-5-350-23-1LJC-F	A dedicated cable is used to connect the QSMA-400 to the input voltage (use 1 of the 4 Channels).	A dedicated cable for connecting a strain gauge (120Ω) to the QSMA-400. (*1)

*1 Other than those recommended, no operation confirmation available.

[Related Products]

Force-Displacement Measurement Unit **FSA series**	Compatible Load Cell for QSMA-400 **eZ -Connect Series**
	
This Unit specializes in measuring and analyzing force-displacement. The high-speed communication of up to 2000Hz, enable to draw precise force -displacement graphs. Choices of Test Stands are offered according to the application requirements.	eZ-Connect series load cells can be connected to the QSMA-400 without accuracy adjustment. Load cells can be replaced depending on the measurement range and sample.

Urethane Spherical Compression Jig **UR series**	Wedge Grip **KC series**	3-point Bending Test Fixture **BT-500N/5000N/5000N-CB (*1)**
		
A compression jig made of urethane material. Allows testing that is close to the feel of a finger.	A pulling jig with a wedge mechanism that increases the holding force by pulling. Chucks can be easily fastened with one touch.	A jig for three-point bending tests. The opening width of the support can be easily adjusted.

*1 The maximum force capacity of the entire configuration is limited based on the applied load cell and the test stand.

[Inspection Certificate / Calibration Certificate]

The Inspection Certificate / Calibration Certificate for force values of the measuring instrument is issued as a chargeable option. Please contact us for further details.

[Cautions]

- Information in this document is subject to change without prior notice.
- This document is product descriptions and handling precautions, and does not guarantee various characteristics or safety.
- This product is designed for measurement purposes only.
- Do not copy and use this content without authorization.
- Some samples cannot be measured depending on their materials or shapes.
- Please do not add force over capacity of a load cell to prevent break-down.
- Displacement reading error can occur due to deflection of a sensor or test stand when load is added.
- Optional attachment, Strain gauge, and PC are Not included in this unit.
- Software could not work in some operating environments.

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Visit our website for more information on wide product specifications, measurement applications and videos.